

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
28 October 2004 (28.10.2004)

PCT

(10) International Publication Number
WO 2004/091396 A3

- (51) International Patent Classification⁷: **A61B 5/06**, **A61K 49/18**
- (21) International Application Number: **PCT/IB2004/050447**
- (22) International Filing Date: **15 April 2004 (15.04.2004)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:
03101022.6 **15 April 2003 (15.04.2003)** **EP**
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report:
17 March 2005
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR THE SPATIALLY RESOLVED DETERMINATION OF PHYSICAL, CHEMICAL AND/OR BIOLOGICAL PROPERTIES OR STATE VARIABLES

(57) Abstract: Method for the spatially resolved determination of physical, chemical and/or biological properties or state variables and/or the change therein in an examination area of an examination object by determining the change in the spatial distribution and/or the mobility, of magnetic particles as a function of the effect of physical, chemical and/or biological influencing variables on at least a part-area by means of the following steps: a) introducing covered and/or coated magnetic particles with at least one solid, viscous and/or liquid shell or coating into at least part of the examination area b) generating a magnetic field with a first part-area having a low magnetic field strength and a second part-area having a higher magnetic field strength, c) changing the, spatial position of the two part-areas in the examination area or changing the magnetic field strength in the first part-area so that the magnetization of the particles is locally changed, d) detecting signals that depend on the magnetization in the examination area that is influenced by this change, and e) evaluating the signals so as to obtain information about the change in the spatial distribution and/or mobility of the magnetic particles in the examination area. The invention also relates to functionalised magnetic particle compositions and magnetic particle compositions suitable for use in the above method. The invention further also relates to an apparatus for the measurement of state variables in the examination area.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/2004/050447

A¹ CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B5/06 A61K49/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B A61K G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 095 124 A (BRUKER MEDIZINTECH) 30 November 1983 (1983-11-30) cited in the application claims 1-3	35
A	US 4 136 683 A (GORDON ROBERT T) 30 January 1979 (1979-01-30) the whole document	35
A	US 6 082 366 A (ANDRAE WILFRIED ET AL) 4 July 2000 (2000-07-04) column 4, line 48 - column 5, line 55	35
P,A	EP 1 304 542 A (PHILIPS CORP INTELLECTUAL PTY ; KONINKL PHILIPS ELECTRONICS NV (NL)) 23 April 2003 (2003-04-23) paragraphs [0030] - [0040], [0050] - [0054]	35

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

8 September 2004

Date of mailing of the international search report

12 01. 2005

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INTERNATIONAL SEARCH REPORT

International application No.
CT/IB2004/050447

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1-19
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-19, 35

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-19, 35

A method and an apparatus for the spatially resolved determination of physical, chemical and/or biological properties or state variables and/or their change in an examination area comprising the step of and means for, respectively, generating magnetic fields, changing its spatial position, detecting and evaluating signals.

2. claims: 20-32

Functionalised magnetic particle composition comprising magnetic particles coated with a functional coating material that changes physico-chemical properties.

3. claims: 33, 34

Magnetic particle composition having a particular magnetization curve.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 1-19

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC/PCT/IB2004/050447

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0095124	A	30-11-1983	DE 3219832 A1	01-12-1983
			AU 551305 B2	24-04-1986
			AU 1490083 A	01-12-1983
			EP 0095124 A1	30-11-1983
			JP 58218950 A	20-12-1983
			ZA 8303784 A	28-03-1984

US 4136683	A	30-01-1979	NONE	

US 6082366	A	04-07-2000	DE 19532676 C1	07-05-1997
			CN 1195404 A	07-10-1998
			DE 19707556 C1	09-07-1998
			WO 9709640 A1	13-03-1997
			EP 0848832 A1	24-06-1998
			ES 2175126 T3	16-11-2002
			JP 11512007 T	19-10-1999

EP 1304542	A	23-04-2003	DE 10151778 A1	08-05-2003
			CN 1412550 A	23-04-2003
			EP 1304542 A2	23-04-2003
			JP 2003199767 A	15-07-2003
			US 2003085703 A1	08-05-2003
